

09/929,488
250901/00

9

REMARKS

Entry of this Amendment is proper under 37 CFR §1.116, since no new claims or issues are raised. The claim amendments are merely an attempt to clarify, only for the Examiner's benefit, the patentable weight of the wording that describes the parameters for which the narrower range of the present invention is significant and to clarify terminology in the claims for terms which the examination of record glosses over.

It is noted that the rejection currently of record makes no attempt to identify specific lines in any of the prior art references that demonstrate that the specific benefits of this claim wording has been recognized in the prior art. That is, as Applicant repeatedly states, the present invention includes a recognition that twist angle can be used for concurrently tuning a number of parameters, some of which conflict with each other, and this concurrent tuning has not been previously recognized in the art.

It is noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

Claims 1-20 are all of the claims pending in the present Application. The Examiner has made a constructive election of claims 1-17 and has withdrawn claims 18-20 from consideration. Claims 1-7 and 10-17 stand rejected under 35 USC §103(a) as unpatentable over US Patent 5,576,867 to Baur et al. Claims 8 and 9 stand rejected under 35 USC §103(a) as unpatentable over Baur, further in view of Applicant's Admitted Prior Art. Claims 8 and 9 stand rejected under 35 USC §103(a) as unpatentable over Baur, further in view of US Patent 6,532,053.

Claims 1-7 and 10-17 stand rejected under 35 USC §103(a) as unpatentable over Baur, further in view of US Patent 6,266,116 to Ohta. Claims 8 and 9 stand rejected under 35 USC §103(a) as unpatentable over Baur, further in view of Ohta '116, and further in view of Applicant's Admitted Prior Art. Claims 8 and 9 stand rejected under 35 USC §103(a) as unpatentable over Baur, further in view of Ohta '116, and further in view of US Patent 6,532,053 to Ohta et al.

09/929,488
250901/00

10

These rejections are respectfully traversed in view of the following discussion.

I. THE CLAIMED INVENTION

As described and claimed, for example, by claim 1, the present invention is directed to an active matrix type liquid crystal display device. A thin film transistor (TFT) substrate having a common wiring and a source/drain wiring is formed on a first substrate. The first substrate is provided with an insulating film covering the common wiring and the source/drain wiring. The insulating film is coated with a first alignment layer.

An opposite substrate, opposing the TFT substrate, having a second alignment layer, is formed on a second substrate. A liquid crystal is held between the first alignment layer and the second alignment layer. A common electrode and a pixel electrode are wired in parallel with each other and are formed as parts of the common wiring and the source/drain wiring, respectively.

An angle made between a direction in which the first alignment layer is subjected to an aligning treatment and a direction in which the second alignment layer is subjected to an aligning treatment is set to a value providing a setting that concurrently:

- decreases a threshold voltage between the pixel electrode and the common electrode required to change a direction of the liquid crystal therebetween;
- increases a response of switching of the liquid crystal; and
- increases a luminance of the liquid crystal, where luminance is the amount of light transmitted through the liquid crystal when a voltage is applied between the pixel electrode and the common electrode. The angle between the first and second alignment directions is set to a value of approximately 0.5 to approximately 4.0 degrees.

An advantage of the present invention compared to conventional techniques is that the initial alignments of the alignment layers are selected in a range of values (e.g., defined in each of the independent claims) that concurrently optimizes a number of characteristics, including switching response, threshold voltage, and luminance. As shown in Figure 6 and Figure 7, the present invention provides measurable threshold voltage decrease and luminance and response

09/929,488
250901/00

11

time increases.

Moreover, as defined by various dependent claims (e.g., claim 2, etc.), by further narrowing the twist angle to 1.5 to 2.0 degrees, a contrast degradation of the liquid crystal can additionally be prevented.

Thus, the prior art of record fails to recognize the significance of this narrower range for setting the twist angle.

II. THE CONSTRUCTIVE RESTRICTION

The Examiner has imposed a constructive restriction on claim 18-20 and withdrawn these claims from consideration. Applicant again submits that any rationale for the constructive restriction has been eliminated by previous claim amendments.

III. THE PRIOR ART REJECTIONS

The Examiner alleges that Baur renders obvious the invention defined by claims 1-7 and 10-17 and, when combined with Applicant's Admitted Prior Art (AAPA) or Ohta '053, renders obvious the invention defined by claims 8 and 9. The Examiner considers that it would be obvious to one of ordinary skill in the art to optimize the twist angle $\beta \leq 15^\circ$.

The Examiner also alleges that Baur, when modified by Ohta '116, renders obvious the invention defined by claims 1-7 and 10-17, and, when further modified by AAPA or Ohta '053, renders obvious claims 8 and 9.

Applicant again disagrees.

It is first noted that the claim wording is changed above so that the Examiner cannot continue to ignore the plain meaning of the language of the claims that the present invention recognizes that twist angle can be used for simultaneously tuning a plurality of parameters, rather than setting twist angle anywhere within a broad range that fails to achieve the simultaneous tuning of a plurality of parameters.

Since the three parameters simultaneously tuned by the claims are now clearly defined in the claims, in order to meet his initial burden, the Examiner must be able to point to specific

09/929,488
250901/00

12

lines in the prior art that demonstrate that the prior art was aware of these specific parameters and that the prior art knew that twist angle affects each parameter (as that parameter is defined in the claims) and that the plurality of these parameters could be set at an ideal level by selecting twist angle in a much narrower range than previously recognized in order to make an optimum setting for the combination of parameters.

That is, the present inventor has recognized the significance of twist angle for setting these parameters, some of which the rejection currently of record fails to properly address as known to even be dependent upon twist angle, let alone known to be simultaneously tuned as mutually beneficial for all these parameters.

The present invention, therefore, is patentable under the concept discussed in MPEP 2144.06: "*A particular parameter must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation. In re Antonie, 559 F.2d 618, 195 USPQ 6 (CCPA 1977).*" (Emphasis by Applicant)

Applicant points out that the range in the independent claims are narrower than any presented in the prior art of record and that the reason for this narrower range is that more than one parameter is being concurrently tuned by this narrower range. This concept of simultaneous parameter tuning is not taught or suggested in the prior art references.

It is further pointed out that the narrow range of the present invention is not an "optimumization" of any one of these parameters, as the rejection of record is understood to suggest. Rather, as clearly shown in Figure 8, transmittance and contrast cannot be simultaneously optimized.

Therefore, contrary to the Examiner's allegation, the narrow ranges of the claimed invention is not merely a matter of routine optimization, since at least two of the parameters cannot be mutually optimized. That is, one of the contributions to the art of the present invention is the recognition that there is a narrow range of twist angles for which transmission and contrast can be together optimized (e.g., as a pair), even though there are different ranges for which each parameter alone would be optimized.

09/929,488
250901/00

13

If the Examiner wishes to continue the present rejection, Applicant respectfully requests that specific lines be identified that demonstrate that twist angle was known to provide an effect. It is brought to the Examiner's attention that none of the prior art references has the goal of optimizing any of these parameters, let alone addresses the combination of parameters listed in the claims. As just mentioned, the present invention is not, as the Examiner seems to imply, an optimization of any specific one of these parameters.

Rather, the present invention defines a range that optimizes the combined effects of the plurality of these listed parameters.

In order for the Examiner to continue to allege that mere routine experimentation would allow one of ordinary skill to optimize the settings listed in the prior art references, there must be at least a suggestion as to "what" one should be attempting to optimize. The rejection currently of record makes no attempt to identify that any of these parameters are being optimized or that it would even be desirable to make such individual parameter optimization.

Indeed, the purpose of each of the prior art references differs from that of optimizing any of these parameters, let alone their combination.

That is, as clearly described in the Abstract and at lines 49-51 of column 2, in Baur the optimization is that of dependence of image contrast on viewing angle. As clearly described in the Abstract, the optimization in Ohta '053 is for "wide visual field angle characteristics, excellent contrast ratio and aperture ratio and capable of improving maximum transmissivity." As clearly described in the Abstract, the optimization in Ohta '116 relates to "wide viewing angle characteristics with homogeneous color tones".

Even assuming arguendo that Ohta '053 and Ohta '116 might be described as suggesting a tuning of a plurality of parameters, these parameters are not the combination explicitly listed in the independent claims: (1) threshold voltage, (2) switching response, and (3) luminance.

Hence, turning to the clear language of the claims, there is no teaching or suggestion of " ... providing a setting that concurrently: decreases a threshold voltage between the pixel

09/929,488
250901/00

14

electrode and the common electrode required to change a direction of said liquid crystal therebetween; increases a response of switching of said liquid crystal; and increases a luminance of said liquid crystal, said luminance being an amount of light transmitted through said liquid crystal, wherein said value of said angle between said first and second alignment directions lies between approximately 0.5 degrees and approximately 4.0 degrees."

For the reasons stated above, the claimed invention is fully patentable over the cited references.

Further, the other prior art of record has been reviewed, but it too even in combination with Baur, Ohta '053, Ohta '116, or Applicant's Admitted Prior Art, fails to teach or suggest the claimed invention.

IV. FORMAL MATTERS AND CONCLUSION

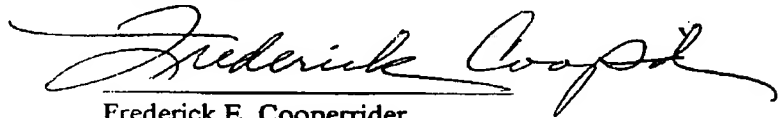
In view of the foregoing, Applicant submits that claims 1-20, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

Date: 11/4/04



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09/929,488
250901/00

15

CERTIFICATE OF FACSIMILE TRANSMISSION

I hereby certify that I am filing this Amendment Under 37 C.F.R. §1.116 by facsimile with the United States Patent and Trademark Office addressed to Examiner Timothy L. Rude, Group Art Unit 2871, at fax number (703) 872-9306 this 4th day of November, 2004.



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